

# Shihua Gong: Curriculum Vitae

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## Research Interests

Cardiovascular fluid-structure interaction; scientific computing and computer simulation; linear and non-linear solvers, numerical analysis; finite element methods; domain decomposition methods; multigrid methods; nonlinearly preconditioning techniques

## Education

**Beijing International Center for Mathematical Research, Peking University, Beijing, China**  
PhD student in Computational Mathematics, 2013-present, ★Advisor: **Jinchao Xu** and **Jun Hu**

**Sun Yat-sen University, Guangzhou, China**  
BS in Information and Computational Science, June 2013

## Professional Experiences

**Mar. 2017 – Sep. 2017** Visiting student, Department of Computer Science, University of Colorado Boulder, USA. Host: Prof. Xiao-Chuan Cai  
**Nov. 2016 – Feb. 2017** Visiting student, Department of Mathematics, Pennsylvania State University, USA. Host: Prof. Jinchao Xu  
**Sep. 2015 – Mar. 2016** Visiting student, Department of Mathematics, Pennsylvania State University, USA. Host: Prof. Jinchao Xu

## Publications

- [1] New hybridized mixed methods for linear elasticity and optimal multilevel solvers. S. Gong, S. Wu, and J. Xu. Submitted to *Numer. Math.*.
- [2] A nonlinear elimination preconditioned inexact Newton method for heterogeneous hyperelasticity. S. Gong, X.-C. Cai. Submitted. to *15th Copper Mountain Conference On Iterative Methods (Student Paper Competition)*.
- [3] A nonlinear elimination preconditioned Newton's method with applications in arterial wall simulation. S. Gong, X.-C. Cai. Accepted. *Proceedings of the 24th International Conference on Domain Decomposition Methods*.
- [4] Interior penalty mixed finite element methods of any order in any dimension for linear elasticity with strongly symmetric stress tensor. S. Wu, S. Gong, and J. Xu. *Mathematical Models and Methods in Applied Sciences*, 27(14), 2711-2743.
- [5] A mathematical model of aortic aneurysm formation. W. Hao, S. Gong, S. Wu, J. Xu, M. R. Go, A. Friedman, and D. Zhu. *PloS one* 12, No. 2 (2017): e0170807.

## *In Preparation*

- [1] Mixed discontinuous Galerkin partitioned Runge-Kutta method for seismic wave simulations. with Shuonan Wu, Jinchao Xu and Dinghui Yang.
- [2] An analysis of the nonlinear elimination preconditioned Newton's method. with Xiao-Chuan Cai.

## Teaching Experiences

1. Teaching Assistant, Introduction to Fluid Mechanics, Peking University, Mar. 2015 - Jul. 2015
2. Teaching Assistant, Functions of Real Variable and Functional Analysis, Peking University, Sept. 2014 - Jan. 2015
3. Teaching Assistant, Linear Algebra, Peking University, Mar. 2014 - Jul. 2014

## Skills

- **Programming:** Latex, C\C++, Matlab, MPI, Boost, **FEniCS**, **PETSc**, Paraview, CMake, Gmesh, CUDA
- **Languages:** Chinese, Cantonese (native), English

## Presentations

- Invited talk, High Performance Numerical Algorithms and Applications, TSIMF, Sanya, Jan. 2018
- The 15th Annual Meeting of Chinese Society for Industrial and Applied Mathematics, Qindao, Oct. 2017
- Portable, Extensible Toolkit for Scientific Computation Annual Meetings, Boulder, USA, Jun. 2017
- The 18th Copper Mountain Conference on Multigrid Methods, Copper Mountain, USA, Mar. 2017
- The 9th National Finite Element Conference, E'mei, China, Aug. 2016
- The 14th Annual Meeting of Chinese Society for Industrial and Applied Mathematics, Xiantan, Aug. 2016
- Invited talk at the State Key Laboratory of Scientific and Engineering Computing (LSEC), Chinese Academy of Sciences, Beijing, Mar. 2016
- Invited talk, CCMA PDEs and Numerical Methods Seminar, Penn State University, USA, Jan. 2016
- The 8th International Congress on Industrial and Applied Mathematics, Beijing, Aug. 2015

## Honor and awards

- 2016-2017, National Scholarship, Department of Education, China
- 2013, Outstanding Graduate Award, Sun Yat-sen University
- 2011, the second prize, China Undergraduate Mathematical Contest in Modeling, CSIAM
- 2009-2010, National Scholarship, Department of Education, China